

What is claimed is:

1 A distributed debugger system, which debugs a distributed system which is configured by a program run on plural computers, comprising:

5 a program manager for executing a management from a predetermined computer to other computers via a network interconnecting said plural computers, said management being related to the setting status and execution status of a debug object program executed
10 on each of said plural computers.

2 The distributed debugger system defined in Claim 1, wherein said program manager comprises:

at least one of controllers for receiving instructions from a user;
15 at least one of executors connected to said debug object program;
each of said controllers including a setting-status manager for managing the setting of each of debuggers constructing said distributed debugger system and
20 communication means for communicating with other controllers or said executors;
each of said executors including a setting-status manager for managing the setting of each of debuggers constructing said distributed debugger system and
25 communication means for communicating with other

controllers or executors;

said setting-status manager changing its setting
content when a change in setting is instructed and
then notifying a setting-status manager in other
5 controller or said executor of the changed content
using said communication means, while said setting-
status manager changes its setting content in
response to notification;

whereby said distributed system to be debugged is
10 debugged using the same setting on all computers in
which said distributed debugger operates.

3 The distributed debugger system defined in Claim 2,
wherein said program manger comprises:

at least one of controllers for receiving instructions
15 from a user;

at least one of executors connected to said debug
object program;

each of said controllers including an execution-status
manager for managing an execution status of each of
20 debuggers constructing said distributed debugger
system, and communication means for communicating
with other controllers or executors;

each of said executors including said execution-status
manager for managing the execution status of said
25 debugger, a process manager for managing a debug

object program, and communication means for communicating with other controllers or executors; wherein said execution-status manager changes its setting content when being instructed to change the execution status; said communication means notifies said execution-status manager in other controller or execution-status manager of the changed content; and said execution-status manager changes its status in response to the notification and instructs said process manager to instruct a change of operation; whereby the same execution status is maintained on all computers on which said distributed debugger system operates.

4 The distributed debugger defined in Claim 2, wherein said program manager comprises:

at least one of controllers for receiving instructions from a user;

at least one of executors connected to said debug object program;

each of said controllers including a user interface for interpreting a request for displaying the status of a debug object program from a user and displaying the results; place decision means for specifying one or more existence places in the status specified based on the nature of the status when the status of a

debug object program is specified and based on the execution status of a debug object program acquired from said process manager, and communication means for communicating with other controller or executor;

5 each of executors including a process manager for managing a debug object program and communication means for communicating with other controller or executor;

10 said user interface inquiring said place decision means in response to a request for displaying the status of a debug object program from a user and then acquiring one or more existence places of the status and transmitting a status capture request to said process managers at all existence places via said
15 communication means;

said process manager checking the execution status of a debug object program under management in response to a status capture request and transmitting results to said user interface at the request source;

20 said user interface receiving one or more results and then outputting said results in a batch mode to said user, whereby said user acquires the status of a distributed system to be objected, without recognizing its existence place.

25 5 The distributed debugger system defined in Claim 2,

wherein said program manager and said debug object manager are realized on the same distributed system construction foundation and wherein program manager uses a communication function provided by said distributed system construction foundation.

6 The distributed debugger system defined in Claim 2, wherein said program manager comprises:

said setting-status manager for holding as a setting status a debug object program activation method;
a remote debugger activator for activating said executor on a remote computer; and
a user interface for interpreting a debug object program from a user and a specification of an execution start place thereof;

said user interface receiving a specification of said debug object program from said user and then notifying said setting-status manager of the specification;

said user interface receiving the specification of said execution start place of said debug object program from said user and instructing said executor specified by said remote debugger activator to activate said executor;

said remote debugger activator activating said executor on a specified computer;

said user interface instructs said activated executor
to start the execution of said debug object program;
said process manager in said executor instructed
acquiring information about a debug object program
5 held in said setting-status manager to start
execution of said debug object program;
whereby execution of a debug object program is started
on a computer different from the computer operated by
said user.

10 7 The distributed debugger system defined in Claim 1,
wherein said program manger comprises:

at least one of controllers for receiving instructions
from a user;

15 at least one of executors connected to said debug
object program;

each of said controllers including an execution-status
manager for managing an execution status of each of
debuggers constructing said distributed debugger
system, and communication means for communicating
20 with other controllers or executors;

each of said executors including said execution-status
manager for managing the execution status of said
debugger, a process manager for managing a debug
object program, and communication means for
25 communicating with other controllers or executors;

wherein said execution-status manager changes its setting content when being instructed to change the execution status; said communication means notifies said execution-status manager in other controller or
5 execution-status manager of the changed content; and said execution-status manager changes its status in response to the notification and instructs said process manager to instruct a change of operation; whereby the same execution status is maintained on
10 all computers on which said distributed debugger system operates.

8 The distributed debugger defined in Claim 7, wherein said program manager comprises:

at least one of controllers for receiving instructions
15 from a user;

at least one of executors connected to said debug object program;

each of said controllers including a user interface for interpreting a request for displaying the status of a
20 debug object program from a user and displaying the results; place decision means for specifying one or more existence places in the status specified based on the nature of the status when the status of a
25 debug object program is specified and based on the execution status of a debug object program acquired

from said process manager, and communication means
for communicating with other controller or executor;
each of executors including a process manager for
managing a debug object program and communication
5 means for communicating with other controller or
executor;

said user interface inquiring said place decision means
in response to a request for displaying the status of
a debug object program from a user and then acquiring
10 one or more existence places of the status and
transmitting a status capture request to said process
managers at all existence places via said
communication means;

said process manager checking the execution status of a
15 debug object program under management in response to
a status capture request and transmitting results to
said user interface at the request source;

said user interface receiving one or more results and
then outputting said results in a batch mode to said
20 user, whereby said user acquires the status of a
distributed system to be objected, without
recognizing its existence place.

9 The distributed debugger system defined in Claim 8,
wherein said program manager and said debug object manager
25 are realized on the same distributed system construction

foundation and wherein program manager uses a communication function provided by said distributed system construction foundation.

10 The distributed debugger system defined in Claim 7,
5 wherein said program manager interprets a request for changing the status of a debug object program, from a user, and instructs said execution-status manager to change the status.

11 The distributed debugger system defined in Claim 10,
10 wherein said program manager and said debug object manager are realized on the same distributed system construction foundation and wherein program manager uses a communication function provided by said distributed system construction foundation.

12 The distributed debugger system defined in Claim 7,
15 wherein said process manager in said executor within said program manager changes its operation according to the operation of a debug object program and changes the status of said execution-status manager within the same executor
20 based on the changed content.

13 The distributed debugger system defined in Claim 12,
wherein said program manager and said debug object manager are realized on the same distributed system construction foundation and wherein program manager uses a
25 communication function provided by said distributed system

construction foundation.

14 The distributed debugger system defined in Claim 7,
wherein said program manager and said debug object manager
are realized on the same distributed system construction
5 foundation and wherein program manager uses a
communication function provided by said distributed system
construction foundation.

15 The distributed debugger defined in Claim 1, wherein
said program manager comprises:

10 at least one of controllers for receiving instructions
from a user;

at least one of executors connected to said debug
object program;

each of said controllers including a user interface for
15 interpreting a request for displaying the status of a
debug object program from a user and displaying the
results; place decision means for specifying one or
more existence places in the status specified based
on the nature of the status when the status of a
20 debug object program is specified and based on the
execution status of a debug object program acquired
from said process manager, and communication means
for communicating with other controller or executor;
each of executors including a process manager for
25 managing a debug object program and communication

means for communicating with other controller or
executor;

said user interface inquiring said place decision means
in response to a request for displaying the status of
5 a debug object program from a user and then acquiring
one or more existence places of the status and
transmitting a status capture request to said process
managers at all existence places via said
communication means;

10 said process manager checking the execution status of a
debug object program under management in response to
a status capture request and transmitting results to
said user interface at the request source;

said user interface receiving one or more results and
15 then outputting said results in a batch mode to said
user, whereby said user acquires the status of a
distributed system to be objected, without
recognizing its existence place.

16 The distributed debugger system defined in Claim 1,
20 wherein said program manager and said debug object manager
are realized on the same distributed system construction
foundation and wherein program manager uses a
communication function provided by said distributed system
construction foundation.

25 17 A debugging method, suitable in use for a distributed

debugger system that debugs a distributed system
configured of a program which runs on plural computers,
said method comprising the step of:

implementing a program management from a predetermined
5 computer to other computers via a network
interconnecting said computers, said program
management being related to the setting status and
execution status of a debug object program to be
executed on each of said computers.

10 18 The debugging method defined in Claim 17, wherein said
program management step comprises the sub-steps of:

transmitting an instruction of a setting change from a
user or other computers to each of said debuggers
constructing said distributed debugger system;
15 changing the setting in response to said instruction;
deciding whether or not said instruction has come from
other computers; and

notifying said debuggers on said other computers of
said instruction via communications when said
20 instruction has not come via communications;

whereby a distributed debugger system to be debugged is
debugged using the same settings on all computers on
which said distributed debugger system operates.

19 The debugging method defined in Claim 18, wherein each
25 of debuggers constructing said distributed debugger system

includes the steps of:

receiving an instruction of a change in execution
status;

deciding whether or not said instructed status

5 corresponds to a change to the same status as a
current status;

changing the status when the instructed status is not
the same as the current status;

deciding whether or not said execution status change is
10 instructed according to a change of the management
status of a debug object program;

instructing said debugger on other computer to change
the execution status via communications when the
status change is instructed due to a change of the

15 management status of said debug object program;

deciding whether or not a debugger is said debugger
which is managing said debug object program when the
status change is not instructed due to a change of
the management status of said debug object program;

20 and

changing the management status of said debug object
program in accordance with the status changed when a
debugger is said debugger which is managing said
debug object program;

25 whereby the same execution status is maintained on all

computers on which said distributed debugger system operates.

20 The debugging method defined in Claim 18, wherein each of said debuggers constructing said distributed debugger system implements the steps of:

receiving an instruction for displaying a status from a user;

interpreting said instruction;

specifying one or more specified status existence places;

transmitting a status capture request to debuggers at all existence places;

acquiring the status of a debug object program by means of said debugger which has received said status capture request;

acknowledging the acquired status to said debugger being a request source;

receiving all replies by means of said debugger being a request source; and

outputting contents of received replies in a batch mode to said user;

whereby said user acquires the status inside said distributed system to be debugged, without recognizing the existence place.

21 The debugging method defined in Claim 17, wherein each

of debuggers constructing said distributed debugger system includes the steps of:

receiving an instruction of a change in execution status;

5 deciding whether or not said instructed status corresponds to a change to the same status as a current status;

changing the status when the instructed status is not the same as the current status;

10 deciding whether or not said execution status change is instructed according to a change of the management status of a debug object program;

instructing said debugger on other computer to change the execution status via communications when the status change is instructed due to a change of the management status of said debug object program;

15 deciding whether or not a debugger is said debugger which is managing said debug object program when the status change is not instructed due to a change of the management status of said debug object program; and

20 changing the management status of said debug object program in accordance with the status changed when a debugger is said debugger which is managing said
25 debug object program;

whereby the same execution status is maintained on all computers on which said distributed debugger system operates.

22 The debugging method defined in Claim 21, wherein each of said debuggers constructing said distributed debugger system implements the steps of:

receiving an instruction for displaying a status from a user;

interpreting said instruction;

specifying one or more specified status existence places;

transmitting a status capture request to debuggers at all existence places;

acquiring the status of a debug object program by means of said debugger which has received said status capture request;

acknowledging the acquired status to said debugger being a request source;

receiving all replies by means of said debugger being a request source; and

outputting contents of received replies in a batch mode to said user;

whereby said user acquires the status inside said distributed system to be debugged, without recognizing the existence place.

23 The debugging method defined in Claim 21, wherein each of debuggers constructing said distributed debugger system, comprises the steps of:

5 receiving an instruction of a status change from a user; and
 interpreting said instruction and then changing the execution status.

10 24 The debugging method defined in Claim 21, wherein each of debuggers constructing said distributed debugger system, comprises the steps of:

 monitoring an operation status of a debug object program; changing the management status of said debug object program when specific requirements are satisfied during monitoring; and
15 instructing an execution status change in accordance with a management status change.

25 25 The debugging method defined in Claims 17, wherein each of said debuggers constructing said distributed debugger system implements the steps of:

 receiving an instruction for displaying a status from a user;
 interpreting said instruction;
 specifying one or more specified status existence places;
25 transmitting a status capture request to debuggers at

all existence places;

acquiring the status of a debug object program by means
of said debugger which has received said status
capture request;

5 acknowledging the acquired status to said debugger
 being a request source;

receiving all replies by means of said debugger being a
request source; and

10 outputting contents of received replies in a batch mode
 to said user;

whereby said user acquires the status inside said
distributed system to be debugged, without
recognizing the existence place.

26 A recording medium, on which a control program for a
15 distributed debugger system for debugging a distributed
system constructed by a program which runs on plural
computers is recorded, said recording medium recording a
program management step of executing a management from a
specific computer to other computers via a network
20 interconnecting plural computers, said management being
related to the setting status and execution status of a
debug object program executed on each of said computers.

27 The recording medium defined in Claim 26, wherein said
program management step comprises the steps of:

25 receiving an instruction of a change of setting from a

user or other computers by means of each of debugger
constructing said distributed debugger system;
changing the setting in response to said instruction;
deciding whether or not said instruction has come from
5 other computers; and

notifying a debugger on other computers of the
instruction via communications when said instruction
is not received via communications;

whereby a distributed debugger to be debugged is
10 debugged using the same setting on all computers on
which said distributed debugger system operates.

28 The recording medium defined in Claim 27, wherein each
of said debuggers constructing said distributed debugger
system implements the steps of:

15 receiving an instruction of an execution status change;
deciding whether or not the instructed status is a
change to the same status as a current status;
changing the status when the instructed status is not
the same as the current status;

20 instructing an execution status change to said debugger
on other computers via communications when a status
change is instructed in accordance with a change of
the management status of the debug object program;
deciding whether or not said debugger managing the
25 debug object program when a status change is not

instructed in accordance with a change of the
management status of the debug object program; and
changing the management status of a debug object
program in accordance with the status changed when a
5 debugger is said debugger managing the debug object
program;

whereby the same execution status is maintained on all
computers on which said distributed debugger system
is operated.

10 29 The recording medium defined in Claim 27, wherein each
of said debuggers constructing said distributed system,
implements the steps of:

receiving an instruction for displaying the status from
a user;

15 interpreting said instruction;
specifying one or more existence places in the
specified status;

transmitting a status capture request to debuggers at
all specified existence places;

20 acquiring the status of the debug object program by
means of said debugger which has received the status
capture request;

returning the acquired status to said debugger being a
request source;

25 receiving all replies by means of said debugger being a

request source; and
outputting contents of said received replies to said
user in a batch mode;
whereby said user acquires the status inside a
5 distributed system to be debugged, without
recognizing the existence place.

30 The recording medium defined in Claim 26, wherein each
of said debuggers constructing said distributed debugger
system implements the steps of:

10 receiving an instruction of an execution status change;
deciding whether or not the instructed status is a
change to the same status as a current status;
changing the status when the instructed status is not
the same as the current status;

15 instructing an execution status change to said debugger
on other computers via communications when a status
change is instructed in accordance with a change of
the management status of the debug object program;
deciding whether or not said debugger managing the
20 debug object program when a status change is not
instructed in accordance with a change of the
management status of the debug object program; and
changing the management status of a debug object
program in accordance with the status changed when a
25 debugger is said debugger managing the debug object

program;

whereby the same execution status is maintained on all computers on which said distributed debugger system is operated.

5 31 The recording medium defined in any one of Claim 30, wherein each of said debuggers constructing said distributed system, implements the steps of:

receiving an instruction for displaying the status from a user;

10 interpreting said instruction;

specifying one or more existence places in the specified status;

transmitting a status capture request to debuggers at all specified existence places;

15 acquiring the status of the debug object program by means of said debugger which has received the status capture request;

returning the acquired status to said debugger being a request source;

20 receiving all replies by means of said debugger being a request source; and

outputting contents of said received replies to said user in a batch mode;

whereby said user acquires the status inside a distributed system to be debugged, without

25

recognizing the existence place.

32 The recording medium defined in Claim 30, wherein each of said debuggers constructing said distributed system, implements the steps of:

5 . receiving an instruction of a status change from a user; and
interpreting the instruction and changing the execution status thereof.

33 The recording medium defined in Claim 30, wherein each of said debuggers constructing said distributed system, implements the steps of:

10 monitoring the operation status of a debug object program;
changing the management status of the debug object
15 program when specific requirements are satisfied during monitoring; and
instructing a change in execution status in accordance with a change in management status.

34 The recording medium defined in Claim 26, wherein each of said debuggers constructing said distributed system, implements the steps of:

20 receiving an instruction for displaying the status from a user;
interpreting said instruction;
25 specifying one or more existence places in the

specified status;

transmitting a status capture request to debuggers at
all specified existence places;

acquiring the status of the debug object program by

5 means of said debugger which has received the status
capture request;

returning the acquired status to said debugger being a
request source;

10 receiving all replies by means of said debugger being a
request source; and

outputting contents of said received replies to said
user in a batch mode;

whereby said user acquires the status inside a
distributed system to be debugged, without
15 recognizing the existence place.